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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,591	01/22/2002	Soon Ho Lee	PAS203A	6951

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EXAMINER

MOORE, KARLA A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 05/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n N .	Applicant(s)	
	10/055,591	LEE ET AL.	
	Examiner	Art Unit	
	Karla Moore	1763	

-- The MAILING DATE f this communication appears on th c ver sheet with the c rresp ndenc address --

Period f r R ply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____ .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disp sition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 and 7-8 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,007,675 to Toshima.

3. Toshima discloses a semiconductor manufacturing apparatus in Figure 4b comprising: a cassette station (1060-1063) in which wafers are loaded; a standby conveying robot (2000) for taking wafers out of the cassette station; a load lock chamber (1040 and 1041) in which the wafers taken by the standby conveying robot are accommodated; and a reaction chamber (1260) placed in contact with the load lock chamber, the reaction chamber having a shuttle blade (1360 and 0361, column 10, rows 59-61) for drawing the wafers accommodated in the load lock chamber out of the load lock chamber in a vacuum state and loading the etched wafers in the load lock chamber (column 16, rows 17-20 and column 17, rows 20-28); a rotary robot (1390-1395) for rotatively transferring the wafers taken out of the load lock chamber to be placed on the shuttle blade, and a heater stage (1310-1315; column 15, rows 15-52) for etching the wafers transferred by the rotary robot using a plasma generator (column 9, rows 57 through column 10, rows 10), wherein the load lock chamber is placed at each of the both sides of the reaction chamber adjacent to the standby conveying robot so that the wafers transferred by the standby conveying robot can be continuously loaded into or taken out of the load lock chamber in the process of etching other wafers.

4. With respect to claim 2, said standby conveying robot is placed between the cassette station and the load lock chamber and it has a rotatable arm (column 7, rows 59-61; rotation and extension positions

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are illustrated in Figure 4b by broken lines) for taking the wafers out of the cassette station and loading them in the load lock chamber and a plurality of blades (column 7, rows 49-54) formed at the front end of the arm, for carrying a plurality of wafers (also see Figure 2A).

5. With respect to claim 3, the blades of the arm hold the wafers using vacuum absorption (column 7, rows 54-58).

6. With respect to claim 7, each plasma generator may be set corresponding to each heater stage to allow different gases of the same gas to be introduced into the reaction chamber for plasma process with a controller (column 11, rows 53-57; column 15, rows 31-35 and column 16, rows 41-44).

7. With respect to claim 8, the reaction chamber has multiple heater stages, each heater stage being capable of controlling temperature independently (column 10, row 65 through column 11, row 1).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,007,675 to Toshima in view of U.S. Patent No. 5,186,594 to Toshima et al.

10. Toshima discloses the invention substantially as claimed in Figure 4B and comprising: a cassette station (1060-1063) in which wafers are loaded; a standby conveying robot (2000) for taking wafers out of the cassette station; a load lock chamber (1040 and 1041) having a wafer holder (see Figure 2A, 24) in which the wafers taken by the standby conveying robot are accommodated; and a reaction chamber (1260) placed in contact with the load lock chamber, the reaction chamber having a shuttle blade (1360 and 0361, column 10, rows 59-61) for drawing the wafers accommodated in the load lock chamber out of the load lock chamber in a vacuum state and loading the etched wafers in the load lock chamber (column 16, rows 17-20 and column 17, rows 20-28); a rotary robot (1390-1395) for rotatively transferring the

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wafers taken out of the load lock chamber to be placed on the shuttle blade, and a heater stage (1310-1315; column 15, rows 15-52) for etching the wafers transferred by the rotary robot using a plasma generator (column 9, rows 57 through column 10, rows 10). Additionally, the wafer holder can be moved up and down (column 8, rows 63-66), as recited in claim 4.

11. However, Toshima fails to teach the wafer holder as being rotated.

12. Toshima et al. disclose a wafer holder located in a load lock chamber capable of being rotated/pivoted for the purpose of providing easy access to equipment on two differing sides of the load lock chamber (column 2, rows 25-48).

13. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a wafer holder capable of rotation/pivoting in Toshima in order to provide easy access to equipment on two differing sides of the load lock chamber as taught by Toshima et al.

14. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,007,675 to Toshima.

15. Toshima discloses a semiconductor manufacturing apparatus in Figure 4b comprising: a cassette station (1060-1063) in which wafers are loaded; a standby conveying robot (2000) for taking wafers out of the cassette station; a load lock chamber (1040 and 1041) in which the wafers taken by the standby conveying robot are accommodated; and a reaction chamber (1260) placed in contact with the load lock chamber, the reaction chamber having a shuttle blade (1360 and 0361, column 10, rows 59-61) for drawing the wafers accommodated in the load lock chamber out of the load lock chamber in a vacuum state and loading the etched wafers in the load lock chamber (column 16, rows 17-20 and column 17, rows 20-28); a rotary robot (1390-1395) for rotatively transferring the wafers taken out of the load lock chamber to be placed on the shuttle blade, and a heater stage (1310-1315; column 15, rows 15-52) for etching the wafers transferred by the rotary robot using a plasma generator (column 9, rows 57 through column 10, rows 10). Additionally, Toshima teaches that stages 1314 and 1315 may be utilized as pre-heating/heating stages (i.e. the stages are not necessarily provided with plasma generators) (column 15, rows 16-30 and 45-46).

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16. However, Toshima fails to explicitly teach the rotation pneumatic actuator as an air cylinder.

17. As the two structures are equivalent and commonly known to be used and capable of imparting the same sort of movement, it would have been obvious to one of ordinary skill in the art to replace the pneumatic actuator of Toshima with an air cylinder.

18. The courts have ruled that an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. In re Fout, 675 F. 2d 297, 213 USPQ 532 (CCPA 1982).

19. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,007,675 to Toshima in view of U.S. Patent No. 5,609,689 to Kato et al.

20. Toshima discloses a semiconductor manufacturing apparatus in Figure 4b comprising: a cassette station (1060-1063) in which wafers are loaded; a standby conveying robot (2000) for taking wafers out of the cassette station; a load lock chamber (1040 and 1041) in which the wafers taken by the standby conveying robot are accommodated; and a reaction chamber (1260) placed in contact with the load lock chamber, the reaction chamber having a shuttle blade (1360 and 0361, column 10, rows 59-61) for drawing the wafers accommodated in the load lock chamber out of the load lock chamber in a vacuum state and loading the etched wafers in the load lock chamber (column 16, rows 17-20 and column 17, rows 20-28); a rotary robot (1390-1395) for rotatively transferring the wafers taken out of the load lock chamber to be placed on the shuttle blade, and a heater stage (1310-1315; column 15, rows 15-52) for etching the wafers transferred by the rotary robot using a plasma generator (column 9, rows 57 through column 10, rows 10). Additionally, Toshima teaches that stages 1314 and 1315 may be utilized as pre-heating/heating stages (i.e. the stages are not necessarily provided with plasma generators) (column 15, rows 16-30 and 45-46).

21. However, Toshima fails to teach placement of the heating mechanism above the substrates, rather than below.

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22. Kato et al. teaches the use of preheating stations provided with heating devices above the substrate for the purpose of heating quickly and uniformly heating a wafer (Figure 1; column 3, rows 43-55).

23. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have alternatively provided heating/preheating means above a substrate in the prior art in order to quickly and uniformly heat a wafer as taught by Kato et al.

24. Claims 9-11 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toshima as applied to claims 1-3 and 7-8 above, and further in view of European Patent No. 0 392 134 A2 to Cheng et al.

25. Toshima discloses the invention substantially as claimed and as described above.

26. However, Toshima fails to disclose an auxiliary plasma generator set under a predetermined part of the reaction chamber in order to remove remnants attached onto the backside of a wafer before the wafer is placed onto the shuttle blade to be transferred.

27. Cheng et al. teach the use of an auxiliary plasma generator set under a predetermined part of a reaction chamber for the purpose of removing impurities, including moisture from the backside and/or to inhibit undesired deposition of material onto the backside (abstract and column 3, rows 12-55).

28. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an auxiliary plasma generator set under a predetermined part of a reaction chamber in Toshima in order to remove impurities, including moisture, from the backside and/or to inhibit undesired deposition of material onto the backside of the wafer as taught by Cheng et al.

29. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toshima and Toshima et al. as applied to claim 4 above, and further in view of European Patent No. 0 392 134 A2 to Cheng et al.

30. The prior art discloses the invention substantially as claimed and as described above.

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31. However, the prior art fails to disclose an auxiliary plasma generator set under a predetermined part of the reaction chamber in order to remove remnants attached onto the backside of a wafer before the wafer is placed onto the shuttle blade to be transferred.

32. Cheng et al. teach the use of an auxiliary plasma generator set under a predetermined part of a reaction chamber for the purpose of removing impurities, including moisture from the backside and/or to inhibit undesired deposition of material onto the backside (abstract and column 3, rows 12-55).

33. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an auxiliary plasma generator set under a predetermined part of a reaction chamber in the prior art in order to remove impurities, including moisture, from the backside and/or to inhibit undesired deposition of material onto the backside of the wafer as taught by Cheng et al.

34. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toshima as applied to claim 5 above, and further in view of European Patent No. 0 392 134 A2 to Cheng et al.

35. The prior art discloses the invention substantially as claimed and as described above.

36. However, the prior art fails to disclose an auxiliary plasma generator set under a predetermined part of the reaction chamber in order to remove remnants attached onto the backside of a wafer before the wafer is placed onto the shuttle blade to be transferred.

37. Cheng et al. teach the use of an auxiliary plasma generator set under a predetermined part of a reaction chamber for the purpose of removing impurities, including moisture from the backside and/or to inhibit undesired deposition of material onto the backside (abstract and column 3, rows 12-55).

38. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an auxiliary plasma generator set under a predetermined part of a reaction chamber in the prior art in order to remove impurities, including moisture, from the backside and/or to inhibit undesired deposition of material onto the backside of the wafer as taught by Cheng et al.

39. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toshima and Kato et al. as applied to claim 6 above, and further in view of European Patent No. 0 392 134 A2 to Cheng et al.

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40. The prior art discloses the invention substantially as claimed and as described above.
41. However, the prior art fails to disclose an auxiliary plasma generator set under a predetermined part of the reaction chamber in order to remove remnants attached onto the backside of a wafer before the wafer is placed onto the shuttle blade to be transferred.
42. Cheng et al. teach the use of an auxiliary plasma generator set under a predetermined part of a reaction chamber for the purpose of removing impurities, including moisture from the backside and/or to inhibit undesired deposition of material onto the backside (abstract and column 3, rows 12-55).
43. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided an auxiliary plasma generator set under a predetermined part of a reaction chamber in the prior art in order to remove impurities, including moisture, from the backside and/or to inhibit undesired deposition of material onto the backside of the wafer as taught by Cheng et al.

Conclusion


44. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km
May 12, 2003


Luz L. Alejandro
Primary Examiner
Art Unit 1763